



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/565,004

01/19/2006

Tsuyoshi Uchara

Q92479

5166

23373 7590 07/25/2007  
SUGHRUE MION, PLLC  
2100 PENNSYLVANIA AVENUE, N.W.  
SUITE 800  
WASHINGTON, DC 20037

EXAMINER

CHEN, KEATH T

ART UNIT

PAPER NUMBER

1709

MAIL DATE

DELIVERY MODE

07/25/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/565,004

**Applicant(s)**

UEHARA ET AL.

**Examiner**

Keath T. Chen

**Art Unit**

1709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 13-26 and 28-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 01/19/2006.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted. Groups:

- I. Claims 1-27, drawn to plasma electrode structure and flow guide.
- II. Claims 28-34, drawn to synchronizer, classified in class 323, subclass 22.

The inventions listed as Groups I & II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The common inventive concept between group I and group II is one electric field applying electrode and one ground electrode. This common inventive concept is not special (e.g. US patent 5810963) and lack of unity of invention.

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

The species in group I are as follows:

- IA. Claims 1-12 and 27, drawn to the plasma electrode structure, classified in class 118, subclass 723E.

Art Unit: 1709

1B: Claims 13-26, drawn to flow guide,  
classified in class 137, subclass 8.

Applicant is required, in reply to this action, to elect a single species to which the claims shall be restricted if no generic claim is finally held to be allowable. The reply must also identify the claims readable on the elected species, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered non-responsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

The claims are deemed to correspond to the species listed above in the following manner: Claims 1-12 and 27, drawn to plasma electrode structure; claims 13-26, drawn to flow guide.

The following claim(s) are generic: No claims are generic.

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: the common technical feature between species IA and IB is the electrode structure. This feature is not a special technical feature as the electrode structure is not novel.

**Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.**

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one

or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

1. During a telephone conversation with Carl Pellegrini and Alan J. Kasper on 7/19/07, a provisional election was made without traverse to prosecute the invention of Group IB, claims 1-12 and 27. Affirmation of this election must be made by applicant in replying to this Office action. Claims 13-26, 28-34 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 601, 602, and 603 (page 29, first paragraph). (There are many similar problems). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Lines 5-6 and similarly in 8-9: "... including a plurality of electrode members each having a length shorter than that of said workpiece ..." failed to distinctly claim the subject matter because infringement depends on object worked on.

4. Claim 27 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

From the 5<sup>th</sup> line from the last: "... an introduction port forming part for forming said introduction port" states an introduction port forming part is part of the introduction port.

From the 3<sup>rd</sup> line from the last: "said introduction port of said introduction port forming part ..." states the introduction port is part of the introduction port forming part, contradicting the previous statement.

Claim 27 will be examined as, for the 3<sup>rd</sup> line from the last line: "said introduction port forming part of said introduction port ..."

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-6, 11-12, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Perrin et al. (US 6281469, hereafter '469).

'469 teaches all limitations of claim 1:

An electrode structure of a plasma processing apparatus (col. 2, lines 29-34) for plasmatizing a processing gas in a discharge space and jetting the plasmatized gas (col. 10, lines 64-66) so as to be contacted to a workpiece (col. 1, lines 29-31) to be processed, said electrode structure forming said discharge space in said apparatus, said electrode structure comprising: a first electrode row (Fig. 15, row #12A) including a plurality of electrode members each having a length shorter than that of said workpiece and arranged in a side-by-side relation in one direction, said first electrode row as a whole having a length corresponding to that of said workpiece (Fig. 21); a second electrode row (Fig. 15, row #12B) including another plurality of electrode members each having a length shorter than that of said workpiece and arranged in a side-by-side relation with each other and in a parallel relation with said first electrode row, said second electrode row as a whole having a length corresponding to that of said workpiece; one of said electrode members of said first electrode row and one of said electrode members of said second electrode rows, which are arranged in substantially



Art Unit: 1709

same positions in the side-by-side arranging directions, having opposite polarities (Fig. 21) and forming a row-to-row partial gap therebetween, said row-to-row partial gap serving as a part of said discharge space (col. 9, lines 1-4); and a row-to-row gap including said row-to-row partial gap between said first and second electrode rows, said row-to-row gap having a length corresponding to that of said workpiece.

'469 further teaches the limitation of claim 2:

Said polarities include an electric field applying pole (Fig. 13, electrode arrangements 10) and a grounding pole (electrode arrangements 20, which can also be subdivided even if not applied with RF, col. 5, lines 55-57), only those of said electrode members constituting said electric field applying pole being connected to different power sources, respectively.

'469 further teaches the limitation of claim 3:

Said polarities include an electric field applying pole and a grounding pole, only those of said electrode members constituting said electric field applying pole being connected to a common power source (col. 6, lines 56-58).

'469 also teaches all limitations of claim 4:

An electrode structure of a plasma processing apparatus for plasmatizing a processing gas in a discharge space and jetting the plasmatized gas so as to be contacted to a workpiece to be processed, said electrode structure forming said discharge space in said apparatus, said electrode structure comprising (Fig. 15): a first electrode row including a plurality of electrode members arranged in a side-by-side relation in one direction; a second electrode row including another plurality of electrode

Art Unit: 1709

members arranged in a side-by-side relation with each other and in a parallel relation with said first electrode row; one of said electrode members of said first electrode row and one of said electrode members of said second electrode rows, which are arranged in substantially same positions in the side-by-side arranging directions, having opposite polarities and forming a row-to-row partial gap therebetween, said row-to-row partial gap serving as a part of said discharge space; a row-to-row gap including said row-to-row partial gap formed between said first and second electrode rows (reasons substantially the same as claim 1 rejection above); and two of said electrode members of each of said electrode rows arranged adjacent to each other in said side-by-side arranging directions being opposite in polarity with respect to each other (as shown in Fig. 15).

'469 further teaches the limitation of claim 5:

An in-row gap is formed (Fig. 15, the vertical gaps) between two of said electrode members arranged adjacent to each other in said side-by-side arranging directions in said first electrode row and/or said second electrode row, said in-row gap also forming a part of said discharge space.

'469 further teaches the limitation of claim 6:

One of said two electrode members includes a first surface (Fig. 15, top line of the first electrode of row #12B, facing #12A) forming said row-to-row gap and a second surface (the face that facing right) disposed at an angle (right angle) with respect to said first surface, and the other of said two electrode members (the second electrode of row #12B, grid patterned) includes a third surface (the face facing #12A) generally flush with

Art Unit: 1709

said first surface and forming said row-to-row gap and a fourth surface (the face facing left) placed opposite to said second surface and arranged at an angle (straight angle) with respect to said third surface, said in-row gap being formed between said second surface and said fourth surface.

'469 further teaches the limitation of claim 11:

Two of said electrode members of each of said electrode rows arranged adjacent to each other in said side-by-side arranging directions being same in polarity with respect to each other (col. 6, lines 8-11, periodicity can be omitted if desired).

For substantially the same reason as claim 1 rejection above, claim 11 is rejected.

'469 further teaches the limitation of claim 12:

Said polarities include an electric field applying pole and a grounding pole (as shown in Fig. 9), and an insulating partition wall (#24, spacer, Fig. 20, an enlarged view of Fig. 9) is interposed between two of said electrode members having said electric field applying pole which are adjacent to each other in said side-by-side arranging directions.

'469 also teaches the limitations of claim 27:

A plasma processing apparatus for introducing a processing gas into a discharge space from an introduction port (Fig. 20, #28), plasmatizing the gas in said discharge space and jetting the plasmatized gas through a jet port (#23) so as to be contact to a workpiece to be processed (col. 10, lines 63-66), said apparatus comprising:  
an electrode structure including a first electrode row consisting of a plurality of electrode members arranged in a side-by-side relation in a direction (horizontal direction in Fig.

Art Unit: 1709

20) intersecting with a direction toward said jet port from said introduction port (vertical direction in Fig. 20), and a second electrode row consisting of another plurality of electrode members arranged in a side-by-side relation with each other and in parallel with said first electrode row; and one of said electrode members of said first electrode row and one of said electrode members of said second electrode rows, which are arranged at a first position in said side-by-side arranging directions, having opposite polarities and forming a first row-to-row partial gap therebetween, said first row-to-row partial gap serving as a part of said discharge space, and another of said electrode members of said first electrode row and another of said electrode members of said second electrode rows, which are arranged at a second position adjacent to said first position, having opposite polarities with each other and forming a second row-to-row partial gap therebetween, said second row-to-row partial gap serving as another part of said discharge space, said electrode member which is arranged at the first position in said first electrode row and said electrode member which is arranged at the second position in said first electrode row having opposite polarities each other and forming an in-row gap therebetween (above 15 lines substantially the same as discussed in claim 4 rejection above); said apparatus further comprising an introduction port forming part (Fig. 20, #27, col. 10, lines 61-62) for forming said introduction port; and said introduction port of said introduction port forming part including a row-to-row introduction port disposed astride said first row-to-row partial gap and said second row-to-row partial gap and an in-row introduction port directly connected to said in-row gap (#27 distribute gas to both row-to-row gas and in-row gap, see Fig. 15 as top view of Fig. 20).

Art Unit: 1709

6. Claims 1 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by OKUI (JP 2000109979, hereafter '979).

'979 teaches all limitations of claim 1:

An electrode structure of a plasma processing apparatus (Fig. 2c) for plasmatizing a processing gas in a discharge space and jetting the plasmatized gas so as to be contacted to a workpiece (Fig. 3, #3-1) to be processed, said electrode structure forming said discharge space in said apparatus, said electrode structure comprising: a first electrode row (#1-2) including a plurality of electrode members each having a length shorter than that of said workpiece (#3 in Fig. 2c or #3-1 in Fig. 3) and arranged in a side-by-side relation in one direction, said first electrode row as a whole having a length corresponding to that of said workpiece; a second electrode row (#1-1) including another plurality of electrode members each having a length shorter than that of said workpiece and arranged in a side-by-side relation with each other and in a parallel relation with said first electrode row, said second electrode row as a whole having a length corresponding to that of said workpiece; one of said electrode members (any one of the five in Fig. 2c) of said first electrode row and one of said electrode members of said second electrode rows, which are arranged in substantially same positions in the side-by-side arranging directions, having opposite polarities and forming a row-to-row partial gap therebetween, said row-to-row partial gap serving as a part of said discharge space; and a row-to-row gap including said row-to-row partial gap between said first and second electrode rows, said row-to-row gap having a length corresponding to that of said workpiece.

'979 further teaches the limitation of claim 11:

Two of said electrode members of each of said electrode rows arranged adjacent to each other in said side-by-side arranging directions being same in polarity with respect to each other.

For substantially the same reason as claim 1 rejection above, claim 11 is rejected.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
7. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over '469, further in view of Koga et al. (US 6518990, hereafter '990).

'469 teaches all limitations of claim 6, as discussed above. '469 also teaches various configurations of two-dimensional electrode arrays, including triangular arrays

Art Unit: 1709

where the in-row gap is at non right-angle to row-to-row surface (Fig. 15-17, col. 9, lines 7-9) are suitable.

'469 does not teach the limitation of claim 7:

Said first surface and second surface form an obtuse angle and said third surface and fourth surface form an acute angle, said in-row gap being in a slantwise relation with said row-to-row gap.

'469 does not teach the limitation of claim 9:

Said electrode row on the opposite side of said electrode row having said first surface, said electrode member located in the substantially same position as said electrode member having said first surface is arranged astride said first surface and the end face of said third surface.

'990 is an analogous art in the field of apparatus which utilizes plurality of electrodes to form charge on the substrate (abstract, Fig. 5), particularly in providing various electrode array arrangement (summary of the invention, col. 3, lines 8-44) for the purpose to achieve uniformity (col. 4, lines 19-26, '469, col. 13, lines 2-4). '990 provides a trapezoid electrode array (Fig. 16) having stable application of charge. Such trapezoid electrode array met the limitation of claim 7 and 9.

Further, '469 discloses the claimed invention except for the shape of the electrode. It would have been an obvious matter of design choice to have altered the shape of electrode from the various shapes already disclosed in '469, since such a modification would have involved a mere change in the shape of a component. A

Art Unit: 1709

change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2nd 669, 149 USPQ 1966.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '990 with '469. Specifically, to have incorporate the electrode array arranged as taught in Fig. 16 of '990 into the electrode array of Fig. 15-17 of '469, for the purpose of achieving uniformity and stable application, with a reasonable expectation of success.

For claim 8, '469 further teaches the rounding of electrode surface (for example, Fig. 12).

'990 further teaches the limitation of claim 8:

Corners on the side of the obtuse angle formed between said first surface and second surface are R-chamfered with a relatively large radius of curvature, while corners on the side of the acute angle formed between said third surface and fourth surface are R-chamfered with a relatively small radius of curvature (col. 4, lines 48-56).

The rounding of corners has two possible results: one corner having a larger radius or a smaller radius than the other corner. '469 discloses the claimed invention except for rounding of corner. It would have been an obvious matter of design choice to vary the shape of corners, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2nd 669, 149 USPQ 1966.

'469 also teaches the limitation of claim 10:



The downstream end of said in-row gap is open in such a manner as to be able to jet a processing gas therefrom and without passing the processing gas through said row-to-row gap (Figs. 18-20 show the jetting portion is more open than the gas introduction port, therefore, processing gas formed in the in-row gap can flow downward directly).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 4042848, 3959104, 5185132, 20030079983, and 20040050685 are cited for various electrode arrangements..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keath T. Chen whose telephone number is 571-270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

Art Unit: 1709

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

kc

*KC*

  
MICHAEL B. CLEVELAND  
SUPERVISORY PATENT EXAMINER